Issued March 22, 1913.

U. S. DEPARTMENT OF AGRICULTURE.

FARMERS' BULLETIN 525.

Rev.ed.
follows

RAISING GUINEA PIGS.

BY

DAVID E. LANTZ,
Assistant, Bureau of Biological Survey.

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LETTER OF TRANSMITTAL.

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF BIOLOGICAL SURVEY,
Washington, D. C., December 28, 1912.

SIR: I have the honor to transmit herewith a report on Raising Guinea Pigs, by David E. Lantz, assistant in the Biological Survey, and to recommend its publication as a farmers' bulletin. Numerous inquiries from various parts of the United States in regard to the best methods of rearing guinea pigs attest a widespread and growing interest in the subject. The present bulletin has the double purpose of supplying the information sought and of obviating the necessity for a voluminous correspondence.

Guinea pigs are raised chiefly for two purposes: As pets and for scientific uses. Guinea pigs make harmless and interesting pets and many are sold in the United States for this purpose alone. The need for the animal in laboratory experiments is considerable and appears to be constantly increasing, so that much of the time the supply is not equal to the demand. Very few guinea pigs are employed for food in this country, but the flesh of the animal is good and nutritious and there is no apparent reason why its use for food should not increase.

Respectfully,

HENRY W. HENSHAW,
Chief, Biological Survey.

Hon. JAMES WILSON,
Secretary of Agriculture.

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RAISING GUINEA PIGS.

INTRODUCTION.

The numerous inquiries received by the Department of Agriculture concerning proper methods of rearing guinea pigs, or cavies, show a widespread interest in the subject throughout the United States. This bulletin, giving the more important details of care and management, is intended to supply the information sought.

FIG. 1.—Smooth-haired cavies.

Guinea pigs, or cavies (fig. 1), are raised chiefly for two purposes—as pets or fancy stock and for scientific uses. The instructions herein given are applicable to all. They are based mainly on the experience of the Bureau of Animal Industry, which has generously allowed the use of the results of its experiments in the preparation of this paper. For several years that bureau has raised large numbers of guinea pigs in its investigations of heredity and the effects of inbreeding, as well as for laboratory uses. The methods employed have been uniformly successful at both of its breeding establishments near Washington.

The cost of rearing a guinea pig to maturity (age 4 or 5 months) at the department stations has been estimated by those in charge at from 50 to 60 cents. With their own labor, private breeders, especially farmers with plenty of green food at command, could probably reduce the cost by half.

In medical research, especially in testing and standardizing antitoxins, immature animals, weighing 250 grams (nearly 9 ounces) are required. This weight is attained in about six weeks, and the cost of feeding the animals until suitable for this purpose will be correspondingly less. Guinea pigs sell at various prices, dependent on supply and demand. The average price for several years has been about 75 cents, but laboratories now report that suitable stock is scarce and that they have been paying from $1 to $1.50 for their supply of young animals. Persons favorably situated near cities or institutions requiring large numbers of guinea pigs should be able to establish a profitable business in supplying them, even at the average price. Aside from laboratory uses there is at present little demand for the animals.

WILD CAVIES.

The guinea pig belongs to a family of rodents known as the Caviidæ. They are characterized by stout bodies, short incisor teeth, uncleft upper lip, nearly equal limbs, and short or rudimentary tails. The front feet are four-toed, the hind ones three-toed. The family is exclusively South American and includes, besides the true cavies (genus *Cavia*), two other living genera, the maras (Patagonian cavies) and the capybara. All are rather closely allied in structure to the rabbits, and in their native habitats are hunted as game. About 20 species and races of the genus *Cavia* have been described. Unlike the domestic cavy, or guinea pig, they all have constant colors and breed but once or twice a year.

THE DOMESTIC CAVY.

Of the origin of the domestic cavy little is known. When the Spaniards first invaded the Andean region of South America the animal was found domesticated and living in large numbers in the houses of the Indians, by whom they were used for food. The cavy was carried to Europe by Dutch traders during the sixteenth century. Since then it has been kept in the Old World and in North America chiefly as a pet, and until recently has been generally regarded as an animal of little practical utility. The name "pig" is readily suggested by its form, but the origin of "guinea" as applied to it is unknown, unless the name is a corruption of "Guiana pig."

Before the arrival of Europeans in Peru and Bolivia the aborigines of those countries had only three domestic animals used for food—the llama, the alpaca, and the coüy or cavy. The last, owing to its abundance, was probably the most important. Spanish writers always referred to the domestic cavy as the "conejo" (rabbit), and this name is still current among Spanish-speaking people in South America. Naturalists have advanced several theories as to which wild species of cavy was the ancestor of the domestic animal, but nothing has been proved. From the great fecundity of the guinea pig and its remarkable tendency to variation, we may assume that its domestication took place in a very remote period. Velasco, in his "Historia del Reino de Quito," states that the Peruvians bestowed much care on the selection and breeding of the animals at the time of the Spanish Conquest.

GUINEA PIGS AS PETS.

For four centuries the guinea pig was regarded merely as a pet and bred for show and fancy alone. Being a plastic animal, it was considerably changed during this period, and several strains and modifications of the original were developed. Thus, besides the smooth-haired forms, we have the Peruvian, which is a very long-haired type, and the Abyssinian, a type with rather long hair standing out in curious rosettes all over the body. The long-haired cavies are not recommended for ordinary pets, as their coats need much care. The smooth-haired require less attention and make equally attractive pets. They have the advantages of being easily kept and of never biting when handled. However, it is not advisable to subject pet animals of any sort to much handling or fondling. Even dogs and cats are always the worse for such treatment, and pet rabbits or guinea pigs soon show the results of much handling in their roughened coats and lack of sprightliness. Long-haired guinea pigs, especially if intended for show, require some handling, since the hair has to be brushed frequently. This is best done while the animal rests on a high shelf where it need not be held during the brushing.

GUINEA PIGS AS FOOD.

It is difficult to account for the somewhat prevalent notion that no rodents are fit for human food. Because of such prejudice, some people will not eat rabbits or squirrels, and probably many others are kept from eating such excellent game as muskrats and prairie dogs. While guinea pigs are seldom eaten in the United States, their near relationship to rabbits and the fact that they are wholly vegetarian in habits should reassure anyone who may entertain doubts about their

fitness for the table. All the species of wild cavies are accounted good game in South America. Rock cavies, especially, are much hunted in parts of Brazil. Probably the small size of the domestic species is the chief cause for its neglect as a food animal, yet we have other highly esteemed game animals that furnish less meat than a guinea pig.

The Peruvian method of dressing the guinea pig for cooking is the one generally adopted wherever it is eaten. The animal is killed by dislocating its neck, after which it goes through about the same processes as a sucking pig in preparation for cooking. Its throat is cut, it is hung up for a few minutes to bleed, and is then scalded in water not too hot at first. The hair is removed, the skin scraped with a knife, the viscera taken out, and the carcass washed in tepid water. It is then ready for the cook. The Peruvians usually roasted the animals, but the number of possible ways of cooking them is unlimited. Charles Cumberland states that they are excellent eating when cooked in any of the ways that are commonly applied to small game. They may be baked whole, or may be cut into pieces and fried or fricasseed. Says Cumberland:

> Cavies are excellent as *entrées* in various stews—with mushrooms, with brown onions, with green peas, *a la soubise*, and especially in curry. A practical cook will have no difficulty in varying the preparations, and I will undertake to say that it will be found difficult to make them other than "very good meate."[1]

On account of the whiteness of its skin the smooth-haired white (albino) guinea pig is best adapted for the table. The males become somewhat strong-flavored with age, but are said to be fine when 4 or 5 months old. Females are said to be tender and finely flavored for a much longer time. They are probably at their best when about a year old.

SCIENTIFIC USE FOR GUINEA PIGS.

Guinea pigs are in much demand for experimental uses in the preparation, testing, and standardizing of serums and antitoxins. They are well adapted for this purpose, being small and easily handled. Their use in medical research is steadily increasing, and some of the large institutions, unable to secure a steady supply of reliable stock for their purposes, have set up breeding establishments of their own.

Sometimes guinea pigs found in bird stores are unfit for laboratory experiments. They may have been previously used for serum or antitoxin tests or may be the offspring of animals that have survived such tests. Unless the dealer knows the source from which the animals came and can absolutely guarantee that they have never been used for experiments, he can rarely sell them to institutions. Any

[1] The Guinea Pig for Food, Fur, and Fancy, London (n. d.), p. 41.

breeder undertaking to supply animals to laboratories must give absolute assurance as to their suitability for experiments. If he can do this and furnish the animals as needed, he should be able to command good prices for them and to establish a permanent and lucrative business.

MANAGEMENT OF GUINEA PIGS.

Few animals are as easily raised as guinea pigs. They are much less subject to diseases than rabbits. The more important items in their management will be explained under the headings: Selection of stock; Hutches and pens; Food; Breeding; and Diseases and enemies.

SELECTION OF STOCK.

For all purposes, except show, the only kinds of guinea pigs that should be grown are the smooth-haired varieties. These are of several colors. Those with pink eyes are albinos, usually pure white, but sometimes more or less marked with obscure spots. Occasionally an individual guinea pig is of a single color other than white. Thus they may be red, gray, brown, or glossy black, but it seems impossible to produce a pure strain of self-colored stock, except the white. The majority of domestic cavies are spotted, the common colors being fawn, light gray, red brown, dark brown, and cream, interspersed with white or black or both white and black. The pigment of the hair extends also to the skin, which is white only under white or cream areas of fur.

If guinea pigs are raised for table use, light-colored kinds are to be preferred; if for scientific purposes, color is of little importance, although distinctive markings are desirable. When raised as pets or for show, the fancy of the breeder may be followed. In any case strong healthy animals of good size should be chosen for breeding stock. A full-grown cavy in good flesh should weigh nearly 2 pounds. This weight will not often be attained under 18 months of age. Instances of 3 pounds weight for males at 3 years have been recorded. As a rule females, except when pregnant, are lighter than males of the same age. The chief point in selecting stock is to obtain healthy animals that will mature quickly and attain a good size.

HUTCHES AND PENS.

Two general methods of managing guinea pigs have been advocated—courts and hutches. In court management the animals are kept in open or covered courts in which they have considerable room to exercise. The courts are divided into smaller runs, each of which has its own hutches or sleeping shelters. The size of the runs is

governed by the numbers of animals to be kept in them. A run 6 by 10 feet would accommodate 30 to 50 guinea pigs. In a warm climate this method has certain advantages. It entails less labor in feeding and cleaning than is required under hutch management. However, for most parts of the United States indoor hutch management is the only plan that can be recommended. In cold weather artificial heat should be supplied. In fact guinea pigs do best when the temperature is not allowed to fall much below 65° F. It is true that they are often kept in outdoor hutches in winter, and that huddled together in warm nests and well fed, they survive the low temperatures; but such management can not be recommended. The animals do not

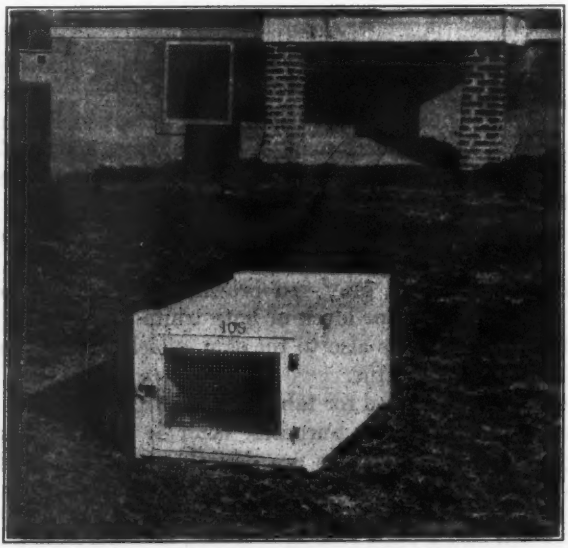

FIG. 2—Breeding hutch used by Bureau of Animal Industry.

thrive well under it, and there is great danger of serious losses of the young through pneumonia. They should not be subjected to sudden changes of temperature nor to dampness.

Guinea pigs require about the same kind of accommodations as rabbits. The same hutches would answer, but they may be smaller for guinea pigs. Those used by the Bureau of Animal Industry are about 20 inches wide at the front, 3½ feet deep, and 18 inches high. (Fig. 2.) These accommodate a male, three or four breeding females, and their progeny until weaned. The door covers nearly the whole front, is hinged at the side, and is made of rather heavy, square-meshed wire netting. Ventilation is afforded by a similarly screened opening at the rear of the hutch. (Fig. 3.) Galvanized poultry netting

of small mesh stretched on a frame would answer for both door and ventilator, and be less expensive. Cheaper hutches made of packing boxes laid on the side and fitted with a door in front would answer every requirement; but if many of the animals are to be raised in a limited space it is desirable to have hutches of uniform size, so that they can be used interchangeably in stacks of any convenient height. (Fig. 4.)

A shelf about 4 inches high is recommended for the back part of each hutch. The space under the shelf is a convenient retreat for females that have young, while the shelf itself is nearly always chosen by the animals as a sleeping place.

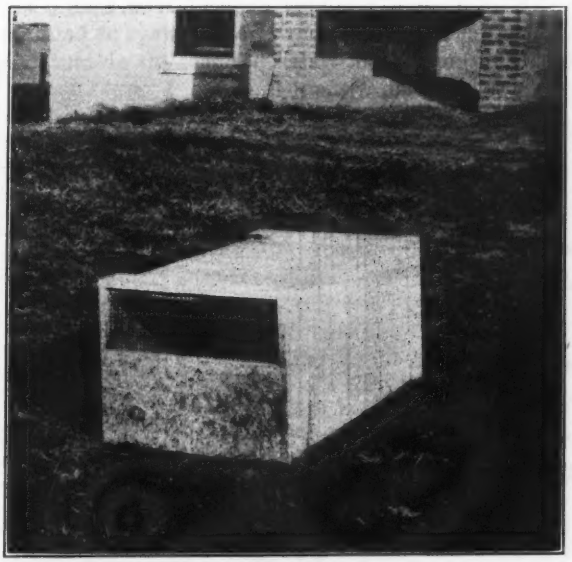

FIG. 3.—Rear of hutch, showing means of ventilation.

Another convenient and cheap plan for indoor runs is shown in figure 5. It is an arrangement of two decks, of five runs each, the floor of the upper being about 4 feet above that of the lower. The space between the decks is open and the walls of the runs are made of boards a foot wide. Each run is 5 feet long and from 20 inches to 2 feet in width. Ten runs are shown in the figure, but the number may be multiplied or the size modified to suit the space available.

FOOD AND FEEDING.

Guinea pigs require about the same diet as rabbits. They eat frequently during the day and need a constant supply of staple dry food. Three articles should be constantly in each hutch or run—a

pan of water, a piece of rock salt, and a pan of dry grain. The last may contain oats, bran, or chopped grain, and the water should be supplied fresh at least once a day. The animals should have also a constant supply of hay, of which they eat large quantities, and a daily feed of green stuff. They eat almost every kind of green food that is relished by rabbits—cabbage, celery tops, and lettuce are especially acceptable, but fresh-cut alfalfa and clover, spinach, kale, rape, and the like are also desirable green foods. For winter it is best to have a good supply of cabbages. These may be stored in the field, covered with leaves or straw, with a layer of soil on top, and may be brought in as wanted, so that they do not need to be fed in wilted condition. With a plentiful supply of green food, guinea pigs drink but little water, yet it is well to have water always at hand for them. In the absence of green food, water becomes an absolute necessity, as they refuse to eat grain without it.

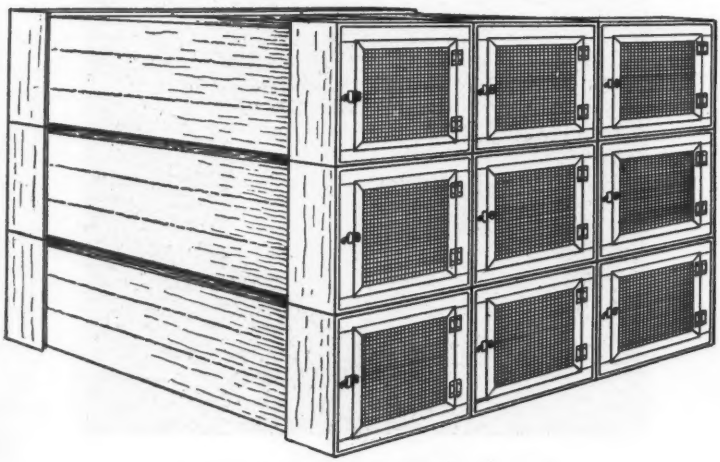

FIG. 4.—A stack of hutches.

BREEDING.

Guinea pigs breed at a very early age. The females are sexually mature when about a month old, but of course should not be allowed to breed so early.

The fecundity of guinea pigs has been greatly exaggerated. Buffon stated that they breed every 6 weeks and commonly have litters of 12 each. This error has been republished from time to time until it seems to have become fixed in the popular mind. As a matter of fact, many other rodents are far more prolific. The female guinea pig has but two mammæ and her period of gestation varies from 63 to 70 days. Ordinarily 5 litters may be expected in a year, averaging

about 3 young each. The first litter produced by a female usually consists of but 1 or 2. Subsequent ones are commonly larger, but they rarely number more than 5 or 6. A female in her breeding prime may be expected to raise about 12 to 15 young each year.

Young guinea pigs are well developed when born, have the eyes open, and are fully furred. They are soon able to run about freely and within a day or two begin to take food other than the mother's milk. When they are about 3 weeks old the mother ceases to give them attention, but it is better to leave them in the hutch with the parents three or four days longer. The weaned animals should then be placed, each sex by itself, in separate cages. Large hutches accommodating 50 or more of the young are desirable, but it is not well to keep males of different sizes in the same cage, as the stronger are apt to fight and injure the weaker ones.

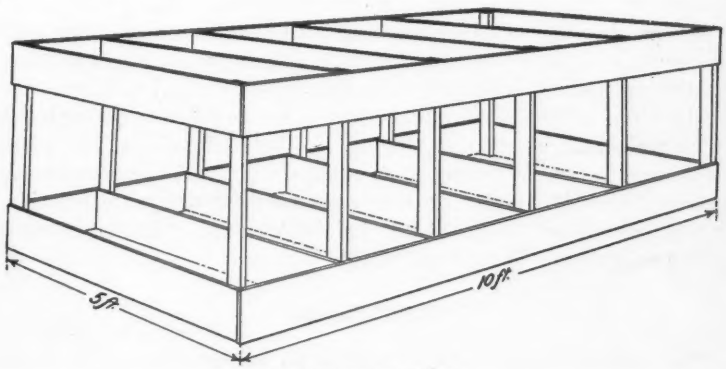

FIG. 5.—Open indoor runs.

When 5 or 6 months old the young females may be distributed to breeding pens. From three to five should be kept permanently with one male; but the best results will probably be attained with the smaller number, since the young when newly born will be in less danger from overcrowding. The male should be chosen from among animals older than the young females. Inbreeding is not considered harmful unless continued for 8 or 10 generations. Usually the females agree well together, and when two have young at about the same time both nurse the progeny indiscriminately. Occasionally two females are antagonistic, and then it is desirable to separate them.

The hutches should be thoroughly cleaned twice a week and fresh litter supplied for the floors. Oat straw, chaff, fine hay, and sawdust all make excellent bedding for the animals. It is not necessary to remove or handle the animals while cleaning the hutches, but this should be done when it is desired to fumigate either hutches or runs.

DISEASES AND ENEMIES.

As already stated, guinea pigs are not subject to many diseases. Their susceptibility to ailments is closely related to the quality, quantity, and kind of food eaten. Improper, irregular, and deficient feeding are common causes of inflammation of the stomach and bowels, from which losses among the animals may be very great. Sudden changes of temperature, particularly downward to the freezing point, and insufficient and improper ventilation are common causes of pneumonia, which is an extremely fatal disease among guinea pigs. Bountiful and judicious feeding, cleanliness of surroundings, pure water, abundant room, reasonably constant temperature, and proper ventilation are almost certain preventives of disease. The coats of guinea pigs should not be allowed to become wet, and the hutches should be carefully guarded against dampness, which is a common cause of fatalities among the animals.

The chief enemy of the guinea pig is the common rat. This pest is popularly supposed to avoid premises where guinea pigs are kept. On the contrary it is attracted by the grain fed, and will not only steal the food of the cavies, but has been known to gnaw through the hutch walls and devour the young. The extermination of rats after they have thoroughly established themselves about the premises is no easy task. Preventive measures are usually much more effective. In a neighborhood that is rat-infested, buildings intended for housing guinea pigs should be made rat proof.

CONCLUSION.

The rearing of guinea pigs requires no extraordinary knowledge and no great outlay of capital. Little space is needed to accommodate the animals, which are hardy and easily managed. They make interesting pets and are useful food animals. The constantly increasing demand for them in scientific investigations and medical research insure a ready market for reasonable numbers at prices that should be remunerative to the producer.

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RAISING GUINEA PIGS

DAVID E. LANTZ
Assistant Biologist

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U. S. Department of Agriculture

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Smooth-haired cavies

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UNITED STATES DEPARTMENT OF AGRICULTURE

Contribution from the Bureau of Biological Survey
E. W. NELSON, Chief

Rev.ed. follows

Washington, D. C. Issued March 23, 1913; revised July, 1918

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RAISING guinea pigs, or cavies, requires no extraordinary knowledge and no great outlay of capital. The animals are hardy, aside from being susceptible to cold, easily managed, and little space is needed to accommodate them. They make interesting pets, are useful as food animals and for scientific purposes. Medical research and other scientific investigations have created a demand for them which should insure remunerative prices to those who are favorably located. It is not advisable to breed cavies in large numbers without first being assured of a market. Profit in breeding the animals for scientific purposes is largely dependent on an opportunity of selling them promptly when they are from 6 to 8 weeks old.

This bulletin gives brief but plain directions for the management of guinea pigs. Since it was first published, in 1913, many persons have engaged in raising the animals for laboratory uses, and increased production has tended to lower the prices. Importations have practically ceased.

Production of cavies for exhibition and food purposes and for pets has increased, also, and many persons are breeding them solely as fancy stock. While there is no present demand for the pelts in the fur trade, many of them are tanned at home and made into articles of use and adornment.

RAISING GUINEA PIGS.

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NUMEROUS inquiries received by the Department of Agriculture concerning proper methods of raising guinea pigs, or cavies, show a widespread interest in the subject throughout the United States. A few years ago when the demand for guinea pigs for laboratory purposes was great the animals were very difficult to obtain, and because of the lack of production in this country, few were to be had. As a result, large numbers were imported. Importations have now practically ceased, but applications for information on breeding the animals continue, as guinea pigs have a food value as well as being useful for scientific purposes and for pets or fancy stock.

They are raised chiefly as pets or fancy stock and for scientific uses. The instructions herein given are applicable to either. They are based mainly on the experience of the Bureau of Animal Industry, which has generously allowed the use of the results of its experiments in the preparation of this paper. For several years that bureau has raised large numbers of guinea pigs in its investigations of heredity and the effects of inbreeding, as well as for laboratory uses. The methods employed have been uniformly successful at both of its breeding establishments near Washington.

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spondingly less. They sell at various prices, dependent on supply and demand. The average for several years has been about 75 cents. When this bulletin was first published (1913) the animals were scarce, and laboratories paid as high as $1 to $1.50 each for their supply. Increased production in America has since lowered prices considerably and the average now paid is from 50 to 60 cents an animal. Even at this low price, persons who are favorably situated near cities or institutions requiring large numbers of guinea pigs may be able to establish a profitable business in supplying the animals. Aside from laboratory uses, there is a growing demand for them as fancy and pet stock.

WILD CAVIES.

Guinea pigs belong to a family of rodents known as the Cavidæ, characterized by stout bodies, short incisor teeth, uncleft upper lip, nearly equal legs, and short or rudimentary tails. The front feet are four-toed, the hind ones three-toed. The family is exclusively South American and includes, besides the true cavies,[1] two other living genera, the maras (Patagonian cavies)[2] and the capybara.[3] All are rather closely allied in structure to the rabbits, and in their native habitats are hunted as game. About 20 species and races of true cavies have been described. Unlike the domestic cavy, or guinea pig, they all have constant colors and breed but once or twice a year.

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SELECTION OF STOCK.

For all purposes, except show, the only kinds of guinea pigs that should be grown are the smooth-haired varieties. These are of several colors. Those with pink eyes are albinos, usually pure white but sometimes more or less marked with obscure spots. Occasionally an individual guinea pig is of a single color other than white. Thus they may be red, gray, brown, or glossy black, but it seems difficult to maintain a pure strain of "selfs" except the white. The majority of domestic cavies are spotted, the common colors being fawn, light gray, red brown, dark brown, and cream, interspersed with white or black or both white and black. The pigment of the hair usually corresponds to that of the skin, which is white only under white or cream areas of fur.

If guinea pigs are raised for table use, light-colored kinds are to be preferred; if for scientific purposes, color is of little importance,

although distinctive markings are desirable. When raised as pets or for show, the fancy of the breeder may be followed. In any case strong healthy animals of good size should be chosen for breeding stock. A full-grown cavy in good flesh should weigh nearly 2 pounds. This weight will not often be attained under 18 months of age. Instances of 3 pounds weight for males at 3 years have been recorded. As a rule females, except when pregnant, are lighter than males of the same age. The chief point in selecting stock is to obtain healthy animals that will mature quickly and attain a good size.

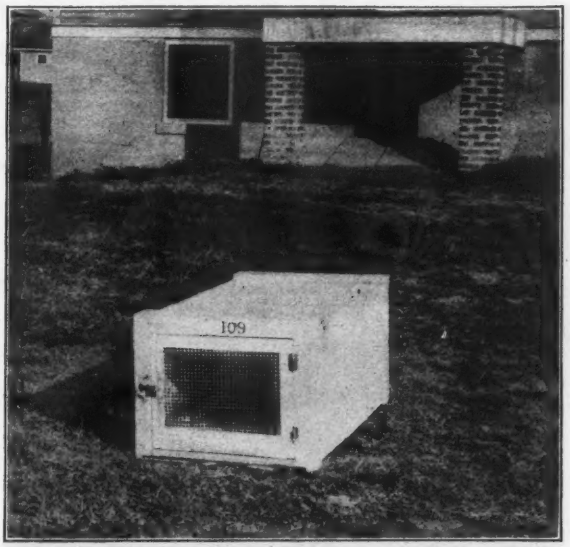

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FIG. 1.—Breeding hutch used by Bureau of Animal Industry.

HUTCHES AND PENS.

Two general methods of managing guinea pigs have been advocated—courts and hutches. In court management the animals are kept in open or covered courts in which they have considerable room to exercise. The courts are divided into smaller runs, each of which has its own hutches or sleeping shelters. The size of the runs is governed by the numbers of animals to be kept in them. A run 6 by 10 feet would accommodate 30 to 50 guinea pigs. In a warm climate this method has certain advantages. It entails less labor in feeding and cleaning than is required under hutch management. However, for most parts of the United States indoor hutch management is the only plan that can be recommended. In cold weather artificial heat should be supplied. In fact guinea pigs do best when the temperature is not allowed to fall much below 65° F. It is true that they are

often kept in outdoor hutches in winter, and that huddled together in warm nests and well fed they survive the low temperatures, but such management can not be recommended. The animals do not thrive well under it, and there is great danger of serious losses of the young through pneumonia. They should not be subjected to sudden changes of temperature or to dampness.

Guinea pigs require about the same kind of accommodations as rabbits. The same hutches would answer, but they may be smaller for guinea pigs. Those used by the Bureau of Animal Industry are about 20 inches wide at the front, 3½ feet deep, and 18 inches high. (Fig. 1.) These accommodate a male, three or four breeding females,

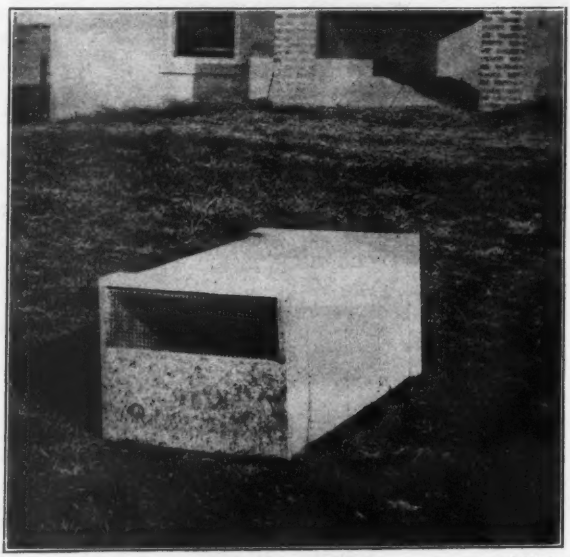

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FIG. 2.—Rear of hutch, showing means of ventilation.

and their progeny until weaned. The door covers nearly the whole front, is hinged at the side, and is made of rather heavy, square-meshed wire netting. Ventilation is afforded by a similarly screened opening at the rear of the hutch. (Fig. 2.) Galvanized poultry netting of small mesh stretched on a frame would answer for both door and ventilator and be less expensive. Cheaper hutches made of packing boxes laid on the side and fitted with a door in front would answer every requirement; but if many of the animals are to be raised in a limited space it is desirable to have hutches of uniform size, so that they can be used interchangeably in stacks of any convenient height. (Fig. 3.)

A shelf about 4 inches high is recommended for the back part of each hutch. The space under the shelf is a convenient retreat for females that have young, while the shelf itself is nearly always chosen by the animals as a sleeping place.

Another convenient and cheap plan for indoor runs is shown in figure 4. It is an arrangement of two decks, of five runs each, the floor of the upper being about 4 feet above that of the lower. The space between the decks is open and the walls of the runs are made of boards a foot wide. Each run is 5 feet long and from 20 inches to 2 feet in width. Ten runs are shown in the figure, but the number may be multiplied or the size modified to suit the space available.

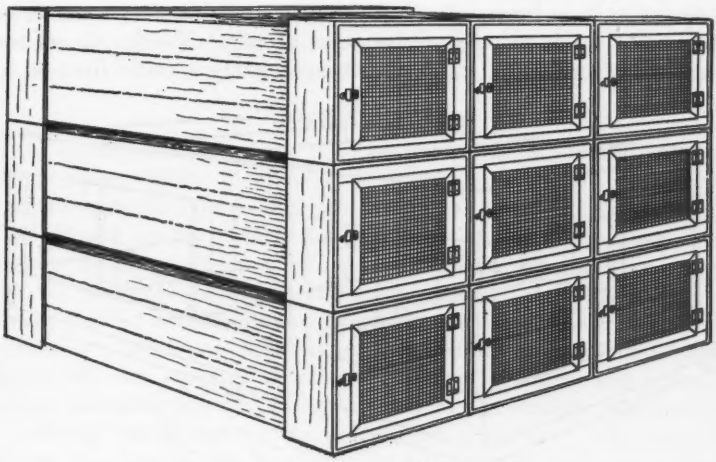

FIG. 3.—A stack of hutches.

FEED AND FEEDING.

Guinea pigs require about the same diet as rabbits. They eat frequently during the day and need a constant supply of staple dry feed. Three articles should be constantly in each hutch or run—a pan of water, a piece of rock salt, and a pan of dry grain. The last may contain oats, bran, or chopped grain, and the water should be supplied fresh at least once a day. The animals should have also a constant supply of hay, of which they eat large quantities, and a daily feed of green stuff. They eat almost every kind of green food that is relished by rabbits—cabbage, celery tops, and lettuce are especially acceptable, but fresh-cut alfalfa and clover, spinach, kale, rape, and the like are also desirable green feeds. For winter it is best to have a good supply of cabbages. These may be stored in the field, covered with leaves or straw, with a layer of soil on top, and may be brought in as wanted, so that they do not need to be fed in wilted condition.

With a plentiful supply of green feed, guinea pigs drink but little water, yet it is well to have water always at hand for them. In the absence of green feed, water becomes an absolute necessity, as they refuse to eat grain without it.

BREEDING.

Guinea pigs breed at a very early age. The females are sexually mature when about a month old, but should not be allowed to breed so early.

The fecundity of guinea pigs has been greatly exaggerated. Buffon stated that they breed every 6 weeks and commonly have litters of 12 each. This error has been republished from time to time until it seems to have become fixed in the popular mind. As a matter of fact, many other rodents are far more prolific. The female guinea pig has but two teats, and her period of gestation varies from 63 to

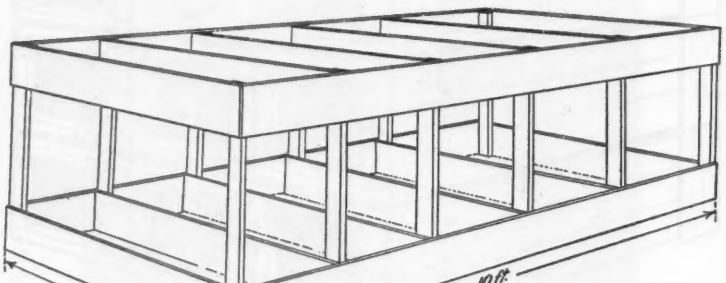

FIG. 4.—Open indoor runs.

70 days. Ordinarily five litters may be expected in a year, averaging about 3 young each. The first litter produced by a female usually consists of but 1 or 2. Subsequent ones are commonly larger, but they rarely number more than 5 or 6. A female in her breeding prime may be expected to raise about 12 to 15 young each year.

Young guinea pigs are well developed when born, have the eyes open, and are fully furred. They are soon able to run about freely and within a day or two begin to take food other than the mother's milk. When they are about 3 weeks old the mother ceases to give them attention, but it is better to leave them in the hutch with the parents three or four days longer. The weaned animals should then be placed, each sex by itself, in separate cages. Large hutches accommodating 50 or more of the young are desirable, but it is not well to keep males of different sizes in the same cage, as the stronger are apt to fight and injure the weaker ones.

When 5 or 6 months old the young females may be distributed to breeding pens. From three to five should be kept permanently with one male; but the best results will probably be attained with the smaller number, since the young when newly born will be in less danger from overcrowding. The males should be chosen from among animals older than the young females. Inbreeding is not considered harmful unless continued for 8 or 10 generations. Usually the females agree well together, and when two have young at about the same time both nurse the progeny indiscriminately. Occasionally two females are antagonistic, and then it is desirable to separate them.

The hutches should be thoroughly cleaned twice a week and fresh litter supplied for the floors. Oat straw, chaff, fine hay, and sawdust all make excellent bedding for the animals. It is not necessary to remove or handle the animals while cleaning the hutches, but this should be done when it is desired to fumigate either hutches or runs.

DISEASES AND ENEMIES.

As already stated, guinea pigs are not subject to many diseases. Their susceptibility to ailments is closely related to the quality, quantity, and kind of food eaten. Improper, irregular, and deficient feeding are common causes of inflammation of the stomach and bowels, from which losses among the animals may be very great. Sudden changes of temperature, particularly downward to the freezing point, and insufficient and improper ventilation are common causes of pneumonia, which is extremely fatal among guinea pigs. Bountiful and judicious feeding, cleanliness of surroundings, pure water, abundant room, reasonably constant temperature, and proper ventilation are almost certain preventives of disease. The coats of guinea pigs should not be allowed to become wet, and the hutches should be carefully guarded against dampness, which is a common cause of fatalities among the animals.

The chief enemy of the guinea pig is the common rat. This pest is popularly supposed to avoid premises where guinea pigs are kept. On the contrary it is attracted by the grain fed, and will not only steal the food of the cavies, but has been known to gnaw through the hutch walls and devour the young. The extermination of rats after they have thoroughly established themselves about the premises is no easy task. Preventive measures are usually much more effective. In a neighborhood that is rat-infested, buildings intended for housing guinea pigs should be made rat-proof.

Farmers' Bulletin No. 896, "House Rats and Mice," will be sent to anyone interested.

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RAISING GUINEA PIGS

RAISING guinea pigs, or cavies, requires no extraordinary knowledge and no great outlay of capital. The animals are hardy, aside from being susceptible to cold. They are easily managed, and little space is needed to accommodate them. They make interesting pets and are useful as food animals and for scientific purposes. Medical research and other scientific investigations have created a demand for them which should insure remunerative prices to those who are favorably located. It is not advisable to breed cavies in large numbers without first being assured of a market. Profit in breeding the animals for scientific purposes is largely dependent on an opportunity of selling them promptly when they are from 6 to 8 weeks old.

This bulletin gives brief but plain directions for the management of guinea pigs. Since it was first published, in 1913, many persons have engaged in raising the animals for laboratory uses, and increased production has tended to lower the prices. Importations have practically ceased. Production of cavies for exhibition and food purposes and for pets has increased, also, and many persons are breeding them solely as fancy stock.

Contribution from the Bureau of Biological Survey
E. W. NELSON, Chief

Washington, D. C.

Issued March 23, 1913
Revised July, 1918
Second revision October, 1921

RAISING GUINEA PIGS.[1]

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UMEROUS inquiries received by the Department of Agriculture concerning proper methods of raising guinea pigs, or cavies, show a widespread interest in the subject throughout the United States. A few years ago when the demand for guinea pigs for laboratory purposes was great the animals were very difficult to obtain, and, because of the lack of production in this country, few were to be had. As a result, large numbers were imported. Importations have now practically ceased, but applications for information on breeding the animals continue, as they have a food value and are useful for experimental and other purposes.

Guinea pigs are raised chiefly as pets or fancy stock and for scientific uses. The instructions herein given are applicable to either. These are based mainly on the experience of the Bureau of Animal Industry, which has generously allowed the use of the results of its experiments in the preparation of this paper. For several years that bureau has raised large numbers of guinea pigs in its investigations of heredity and the effects of inbreeding, as well as for laboratory uses. The methods employed have been uniformly successful at both of its breeding establishments near Washington.

The cost of raising a guinea pig to maturity (age 4 or 5 months) at the department stations has been estimated by those in charge at from 50 to 60 cents. With their own labor, private breeders, especially farmers with plenty of green food at command, can reduce the cost by half.

[1] Revised from data prepared for original edition by the late Prof. David E. Lantz, Assistant Biologist, Bureau of Biological Survey.

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In medical research, especially in testing and standardizing antitoxins, immature animals, weighing 250 grams (nearly 9 ounces) are required. This weight is attained in about six weeks, and the cost of feeding the animals until suitable for this purpose will be correspondingly less. They sell at various prices, dependent on supply and demand. The average for several years has been about 75 cents. When this bulletin was first published (1913) the animals were scarce, and laboratories paid as high as $1 to $1.50 each for their supply. Increased production in America has since lowered prices considerably and the average paid in 1921 was from 50 to 60 cents an animal. Even at this low price, persons who are favorably situated near cities or institutions requiring large numbers of guinea pigs may be able to establish a profitable business in supplying the animals. Aside from laboratory uses, there is a growing demand for them as fancy and pet stock.

WILD CAVIES.

Guinea pigs belong to a family of rodents known as the Cavidæ, characterized by stout bodies, short incisor teeth, uncleft upper lip, nearly equal legs, and short or rudimentary tails. The front feet are four-toed, the hind ones three-toed. The family is exclusively South American and includes, besides the true cavies,[1] two other living genera, the maras (Patagonian cavies)[2] and the capybara.[3] All are rather closely allied in structure to the rabbits, and in their native habitats are hunted as game. About 20 species and races of true cavies have been described. Unlike the domestic cavy, or guinea pig, they all have constant colors and breed but once or twice a year.

THE DOMESTIC CAVY.

Of the origin of the domestic cavy little is known. When the Spaniards first invaded the Andean region of South America the animal was found domesticated and living in large numbers in the houses of the Indians, by whom it was used for food. The cavy was carried to Europe by Dutch traders during the sixteenth century. Since then it has been kept in the Old World and in North America chiefly as a pet, and until recently has been generally regarded as an animal of little practical utility. The name "pig" is readily suggested by its form, but the origin of "guinea" as applied to it is unknown, but may be a corruption of "Guiana pig."

GUINEA PIGS AS PETS.

For four centuries the guinea pig was regarded merely as a pet and bred for show and fancy alone. Being a plastic animal, it was con-

[1] Genus *Cavia*. [2] Genus *Dolichotis*. [3] Genus *Hydrochærus*.

siderably changed during this period, and several strains and modifications of the original were developed. Thus, besides the smooth-haired forms, we have the Peruvian, which is a very long-haired type, and the Abyssinian, a type with rather long hair standing out in curious rosettes all over the body. The long-haired cavies are not recommended for ordinary pets, as their coats need much care. The smooth-haired require less attention and make equally attractive pets. They have the advantages of being easily kept and of never biting when handled. However, it is not advisable to subject pet animals of any sort to much handling or fondling. Even dogs and cats are always the worse for such treatment, and pet rabbits or guinea pigs soon show the results of much handling in their roughened coats and lack of sprightliness. Long-haired guinea pigs, especially if intended for show, require some handling, since the hair has to be brushed frequently. This is best done while the animal rests on a high shelf, where it need not be held during the brushing.

GUINEA PIGS AS FOOD.

It is difficult to account for the somewhat prevalent notion that no rodents are fit for human food. Because of such prejudice, some people will not eat rabbits or squirrels, and probably many others are kept from eating such excellent game as muskrats and prairie dogs. While guinea pigs are seldom eaten in the United States, their near relationship to rabbits and the fact that they are wholly vegetarian in habit should reassure anyone who may entertain doubts about their fitness for the table. All the species of wild cavies are accounted good game in South America. Rock cavies, especially, are much hunted in parts of Brazil. Probably the small size of the domestic species is the chief cause for its neglect as a food animal, yet we have other highly esteemed game animals that furnish less meat than a guinea pig.

The Peruvian method of dressing the guinea pig for cooking is the one generally adopted wherever it is eaten. The animal is killed by dislocating its neck, after which it goes through about the same processes as a sucking pig in preparation for cooking. Its throat is cut, it is hung up for a few minutes to bleed, and is then scalded in water, not too hot at first. The hair is removed, the skin scraped with a knife, the viscera taken out, and the carcass washed in tepid water. It is then ready to cook. The Peruvians usually roast the animals, but the number of possible ways of cooking them is unlimited. Charles Cumberland states that they are excellent eating when cooked in any of the ways that are commonly applied to small game. They may be baked whole, or may be cut into pieces and fried or fricasseed. Says Cumberland:

Cavies are excellent as *entrées* in various stews—with mushrooms, with brown onions, with green peas, *a la soubise*, and especially in curry. A practical cook will have no difficulty in varying the preparations, and I will undertake to say that it will be found difficult to make them other than "very good meate."[4]

On account of the whiteness of its skin the smooth-haired white (albino) guinea pig is best adapted for the table. The males become somewhat strong flavored with age, but are fine when 4 or 5 months old. Females are tender and finely flavored for a much longer time. They are probably at their best when about a year old.

SCIENTIFIC USE FOR GUINEA PIGS.

Guinea pigs are in much demand for experimental uses in the preparation, testing, and standardizing of serums and antitoxins. They are well adapted for this purpose, being small and easily handled. Their use in medical research is steadily increasing, and some of the large institutions, unable to secure a steady supply of reliable stock for their purposes, have set up breeding establishments of their own.

Sometimes guinea pigs found in bird stores are unfit for laboratory experiments. They may have been previously used for serum or antitoxin tests or may be the offspring of animals that have survived such tests. Unless the dealer knows the source from which the animals came and can absolutely guarantee that they have never been used for experiments, he can rarely sell them to institutions. Any breeder undertaking to supply animals to laboratories must give absolute assurance as to their suitability for experiments. If he can do this and furnish the animals as needed, he should be able to command good prices for them and to establish a permanent and lucrative business.

MANAGEMENT OF GUINEA PIGS.

Few animals are as easily raised as guinea pigs. They are much less subject to disease than rabbits. The more important items in their management will be explained under the headings: Selection of stock; Hutches and pens; Feed and feeding; Breeding; and Diseases and enemies.

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[4] The Guinea Pig for Food, Fur, and Fancy, p. 41, London (n. d.).

Thus it may be red, gray, brown, or glossy black, but it seems difficult to maintain a pure strain of "selfs" except the white. The majority of domestic cavies are spotted, the common colors being fawn, light gray, red brown, dark brown, and cream, interspersed with white or black or both white and black. The pigment of the hair usually corresponds to that of the skin, which is white only under white or cream areas of fur.

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HUTCHES AND PENS.

Two methods of managing guinea pigs have been advocated—courts and hutches. In court management the animals are kept in open or covered courts in which they have considerable room to exercise. The courts are divided into smaller runs, each of which has its own hutches or sleeping shelters. The size of the runs is governed by the number of animals to be kept in them. A run 6 by 10 feet would accommodate 30 to 50 guinea pigs. In a warm climate court management has certain advantages. It entails less labor in feeding and cleaning than is required under hutch management. However, for most parts of the United States indoor hutch management is the only plan that can be recommended. In cold weather artificial heat should be supplied. In fact, guinea pigs do best when the temperature is not allowed to fall much below 65° F. It is true that they are often kept in outdoor hutches in winter, and that huddled together in warm nests and well fed they survive the low temperatures, but such management can not be recommended. The animals do not thrive well under it, and there is great danger of serious losses of the young through pneumonia. They should not be subjected to sudden changes of temperature or to dampness.

Guinea pigs require about the same kind of accommodations as rabbits. The same hutches would answer, but they may be smaller for guinea pigs. Those used by the Bureau of Animal Industry are about 20 inches wide at the front, 3½ feet deep, and 18 inches high. (Fig. 1.) These accommodate a male, three or four breeding females,

and their progeny until weaned. The compound hutch shown in figure 2 is suitable for producing cavies on a commercial scale. Each compartment is 30 inches deep by 36 inches long and has a floor space sufficient for five or six breeding females with their litters. The number of compartments in a compound hutch may vary more or less according to the requirements of the breeder. The construction of this hutch is shown in figures 2, 3, 4, and 5. The netting used on the large doors may be galvanized sand screen or poultry netting having a mesh not greater than three-fourths of an inch. In tiered hutches of this sort there should always be enough absorbent bedding to keep the floors dry. Cheaper hutches made of packing boxes laid on the side and fitted with a door in front would answer every requirement, but if many of the animals are to be raised in a limited space it is desirable to have hutches of uniform size.

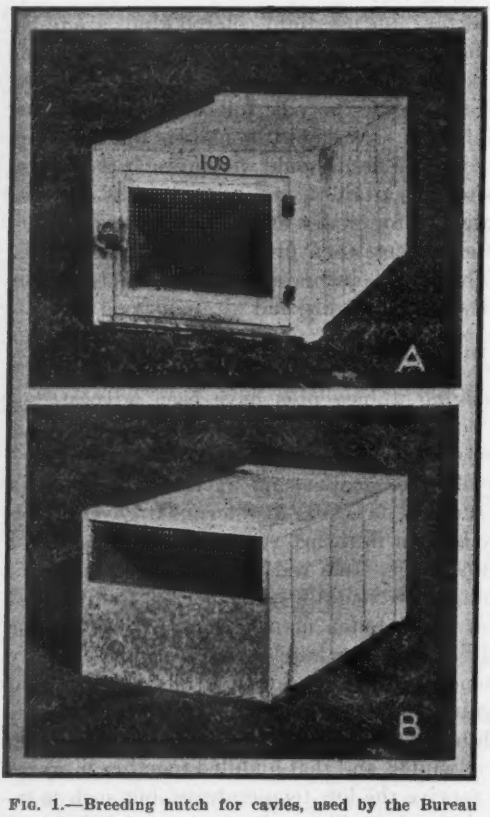

FIG. 1.—Breeding hutch for cavies, used by the Bureau of Animal Industry. *A*, front view; *B*, rear view, showing means of ventilation.

A shelf (fig. 3) about 4 inches high is recommended for the darker part of each hutch. The space under the shelf is a convenient retreat for females that have young, while the shelf itself is nearly always chosen by the animals as a sleeping place.

Another convenient and cheap plan for indoor runs is shown in figure 6. It is an arrangement of two decks, of five runs each, the floor of the upper being about 4 feet above that of the lower. The space between the decks is open and the walls of the runs are made of boards a foot wide. Each run is 5 feet long and from 20 inches to 2

feet in width. Ten runs are shown in the figure, but the number may be multiplied or the size modified to suit the space available.

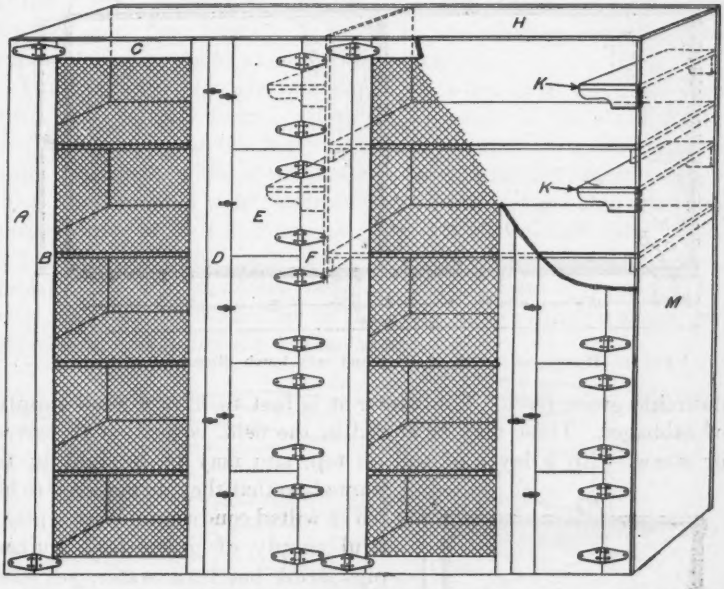

FIG. 2.—Compound hutch suitable for raising cavies on a large scale. Each compartment is 30 inches deep by 36 inches long, and has a floor space sufficient for five or six breeding females with their litters. Details of construction are illustrated in figs. 3, 4, and 5. The following material is required: Lumber, dressed, tongue and groove, 175 square feet; wire cloth, galvanized, ½-inch mesh, 15½ square feet; hinges, 3-inch strap, 1 dozen pairs; buttons, iron, japanned, 14; wood screws, ¾-inch, No. 7, 1 gross.

FEED AND FEEDING.

Guinea pigs require about the same diet as rabbits. They eat frequently during the day and need a constant supply of staple dry feed. Three articles should be constantly in each hutch or run—a

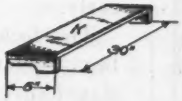

FIG. 3.—Sleeping shelf for darker part of cavy hutches illustrated in figure 2.

pan of water supplied fresh at least once a day, a piece of rock salt, and a pan for dry grain, which may contain oats, bran, or chopped grain. The animals should have also a constant supply of hay, of which they eat large quantities, and a daily feed of green stuff. They eat almost every kind of green food that is relished by rabbits—

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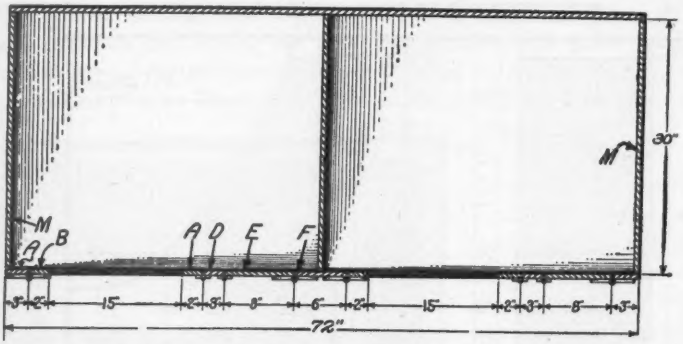

FIG. 4.—Horizontal section of compound cavy hutch illustrated in figure 2.

desirable green feeds. For winter it is best to have a good supply of cabbages. These may be stored in the field, covered with leaves or straw, with a layer of soil on top, and may be brought in as wanted, so that they do not need to be fed in wilted condition. With a plentiful supply of green feed, guinea pigs drink but little water, yet it is well to have water always at hand for them. In the absence of green feed, water becomes an absolute necessity, as these animals refuse to eat grain without it.

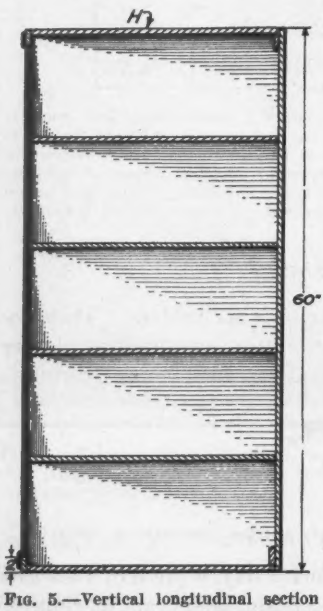

FIG. 5.—Vertical longitudinal section of compound cavy hutch illustrated in figure 2.

BREEDING.

Guinea pigs breed at a very early age. The females are sexually mature when about a month old, but should not be allowed to breed so early.

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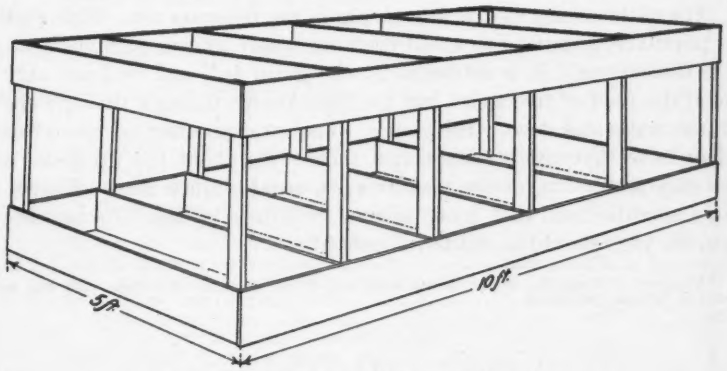

FIG. 6.—Open indoor double-deck runs for cavies.

When 5 or 6 months old the young females may be distributed to breeding pens. From three to five should be kept permanently with one male; but the best results will probably be attained with the smaller number, since the young when newly born will be in less danger from overcrowding. The males should be chosen from among animals older than the young females. Inbreeding is not considered harmful unless continued for 8 or 10 generations. Usually the females agree well together, and when two have young at about the same time both nurse the progeny indiscriminately. Occasionally two females are antagonistic, and then it is desirable to separate them.

The hutches should be thoroughly cleaned twice a week and fresh litter supplied for the floors. Oat straw, chaff, fine hay, and sawdust all make excellent bedding. It is not necessary to remove or handle the animals while cleaning the hutches, but this should be done when it is desired to fumigate either hutches or runs.

DISEASES AND ENEMIES.

As already stated, guinea pigs are not subject to many diseases. Their susceptibility to ailments is closely related to the quality, quantity, and kind of food eaten. Improper, irregular, and deficient feeding are common causes of inflammation of the stomach and bowels, from which losses among the animals may be very great. Sudden changes of temperature, particularly downward to the freezing point, and insufficient and improper ventilation are common causes of pneumonia, which is extremely fatal among guinea pigs. Bountiful and judicious feeding, cleanliness of surroundings, pure water, abundant room, reasonably constant temperature, and proper ventilation are almost certain preventives of disease. The coats of guinea pigs should not be allowed to become wet, and the hutches should be carefully guarded against dampness, which is a common cause of fatalities among the animals.

The chief enemy of the guinea pig is the common rat. This pest is popularly supposed to avoid premises where guinea pigs are kept. On the contrary, it is attracted by the grain fed, and will not only steal the food of the cavies, but has been known to gnaw through the hutch walls and devour the young. The extermination of rats after they have thoroughly established themselves about the premises is no easy task. Preventive measures are usually much more effective. In a neighborhood that is rat-infested, buildings intended for housing guinea pigs should be made rat-proof.[5]

[5] Farmers' Bulletin No. 896, "House Rats and Mice," contains directions and will be sent to anyone interested.

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